

FIG. 1

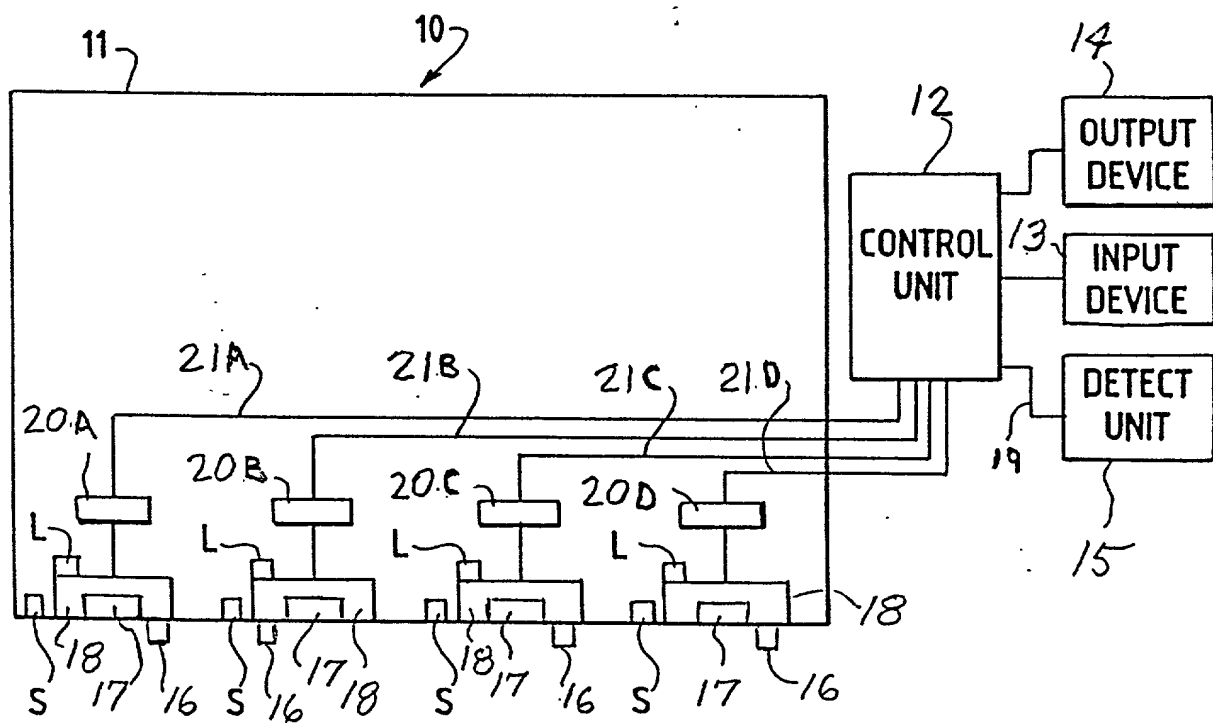


FIG. 2A

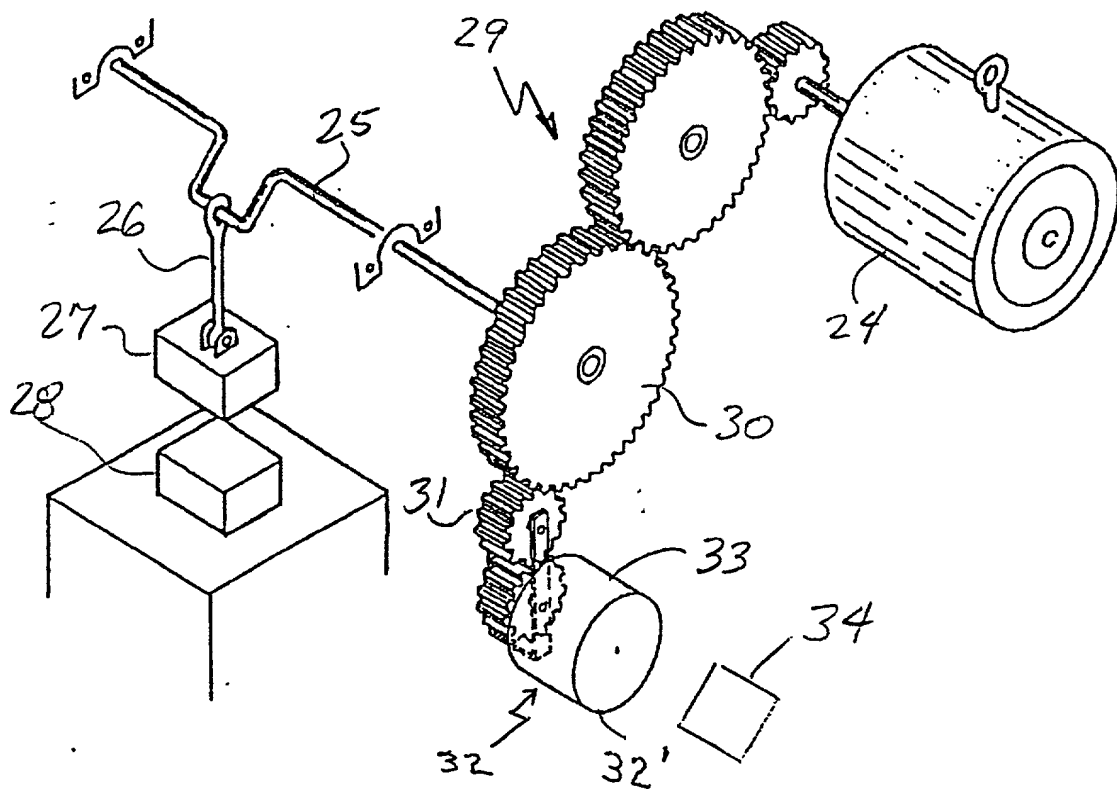


FIG. 2B

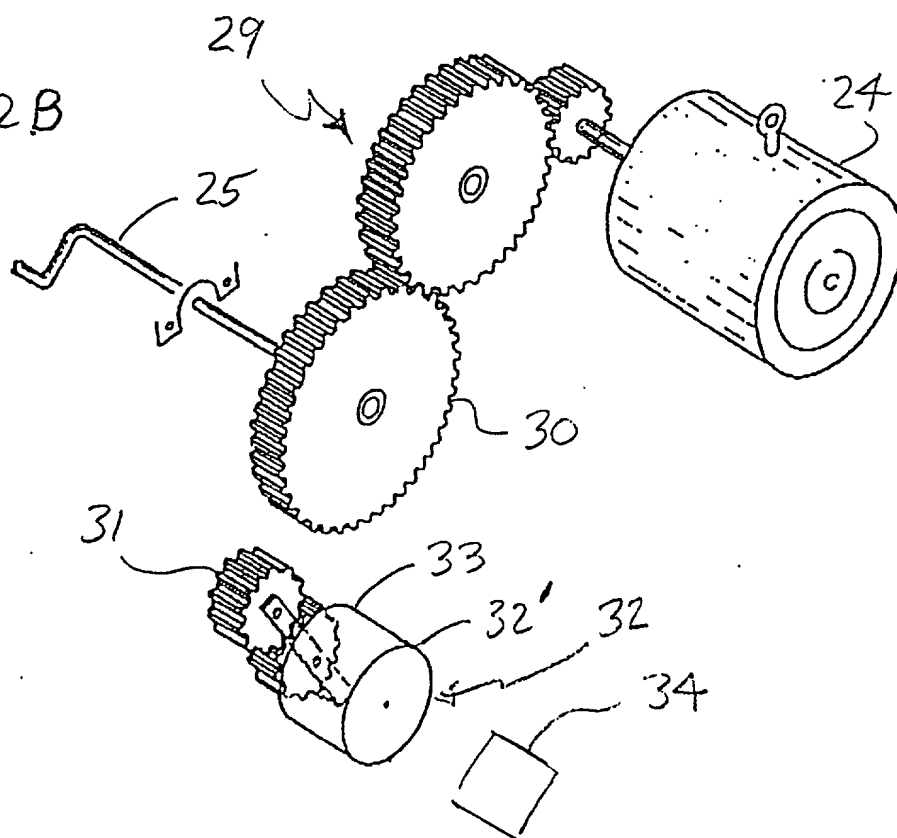


FIG. 3

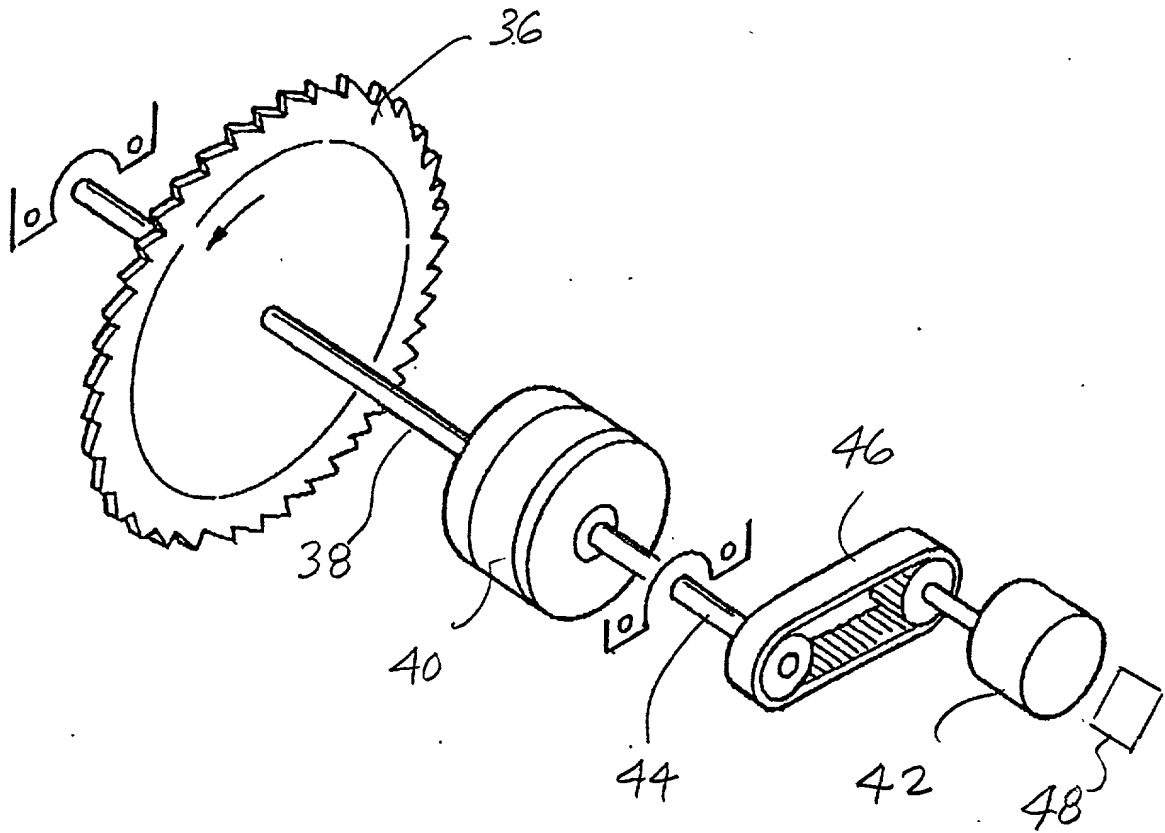


FIG. 4 ZERO SPEED INDICATOR TEST SUBROUTINE
IN SITU TESTING WHILE THE MACHINE IS RUNNING

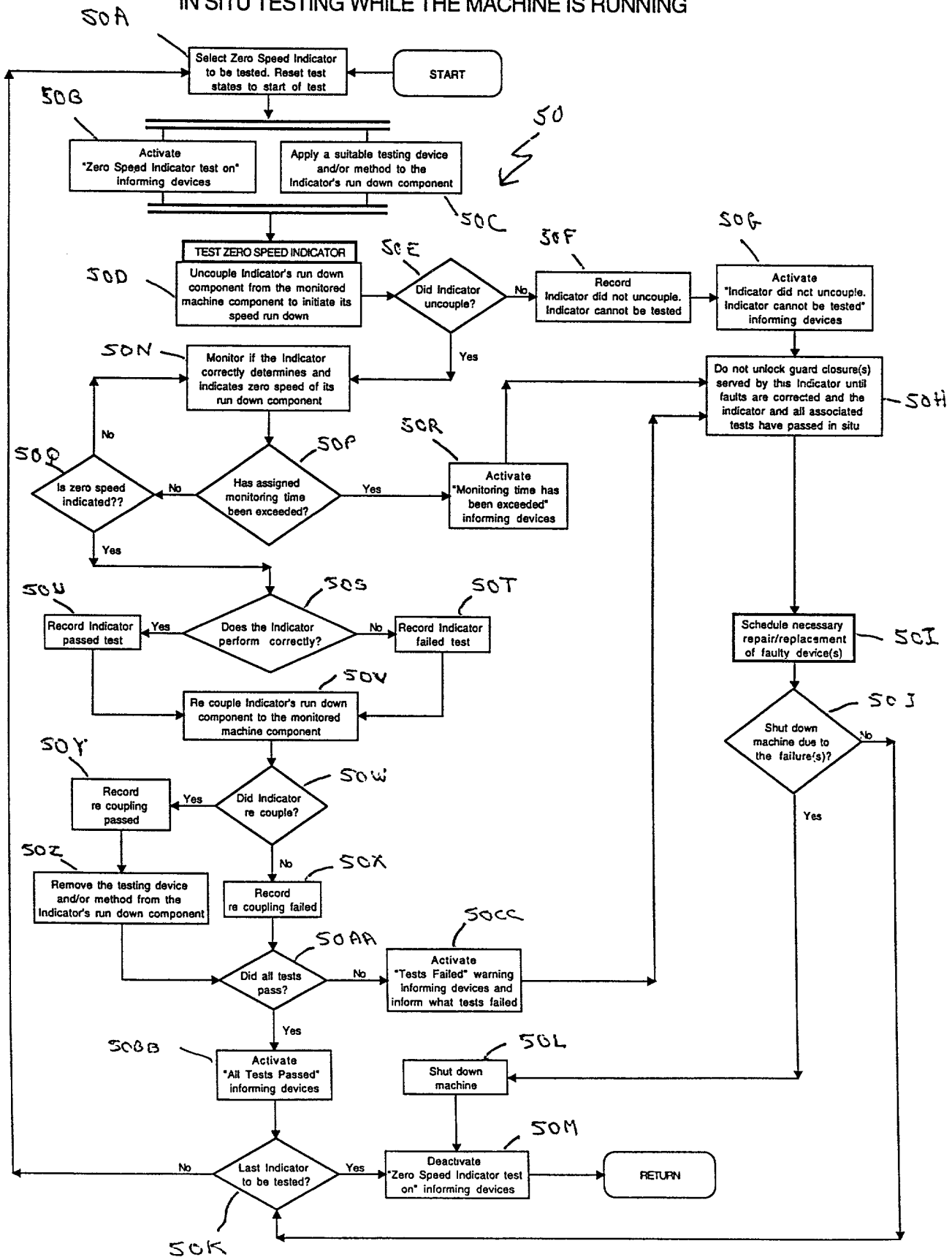


FIG. 5

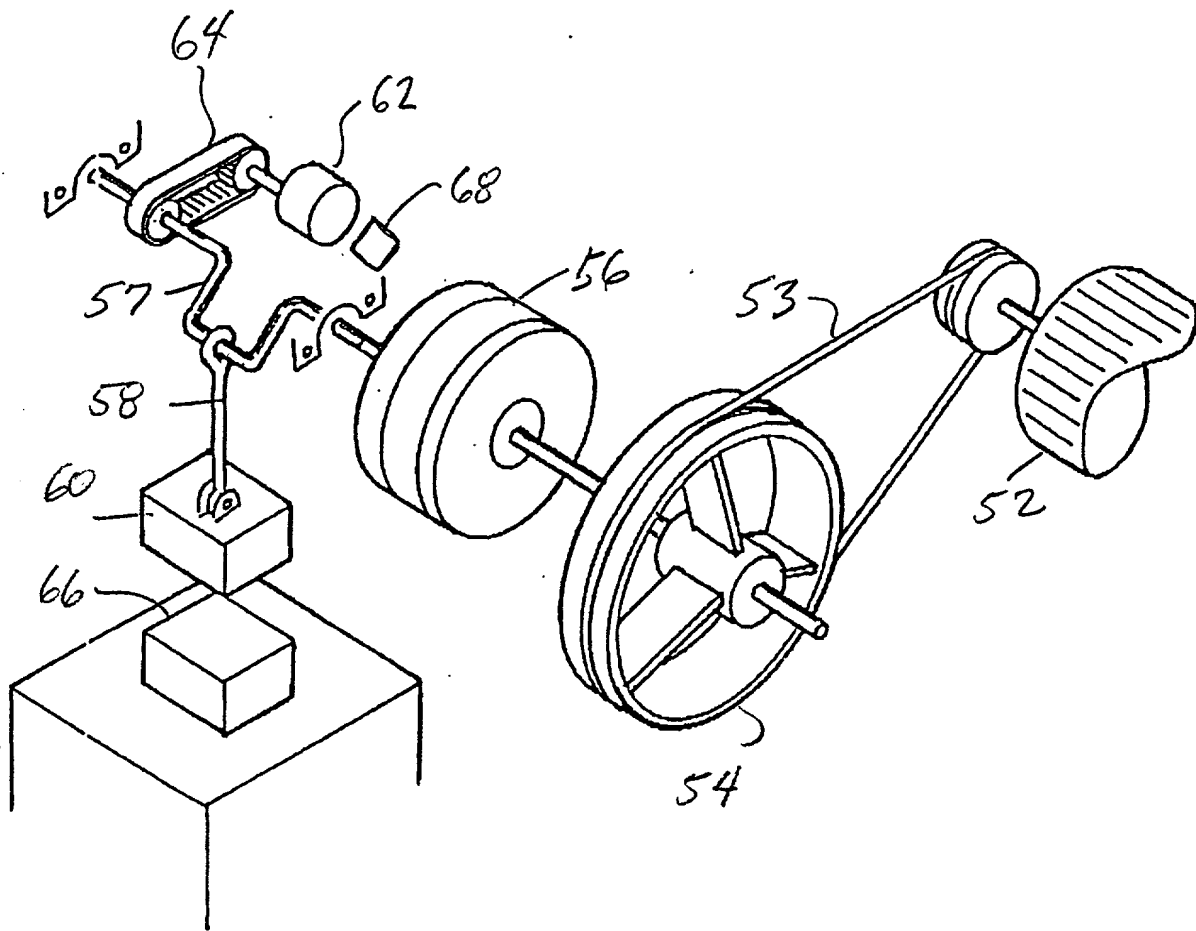
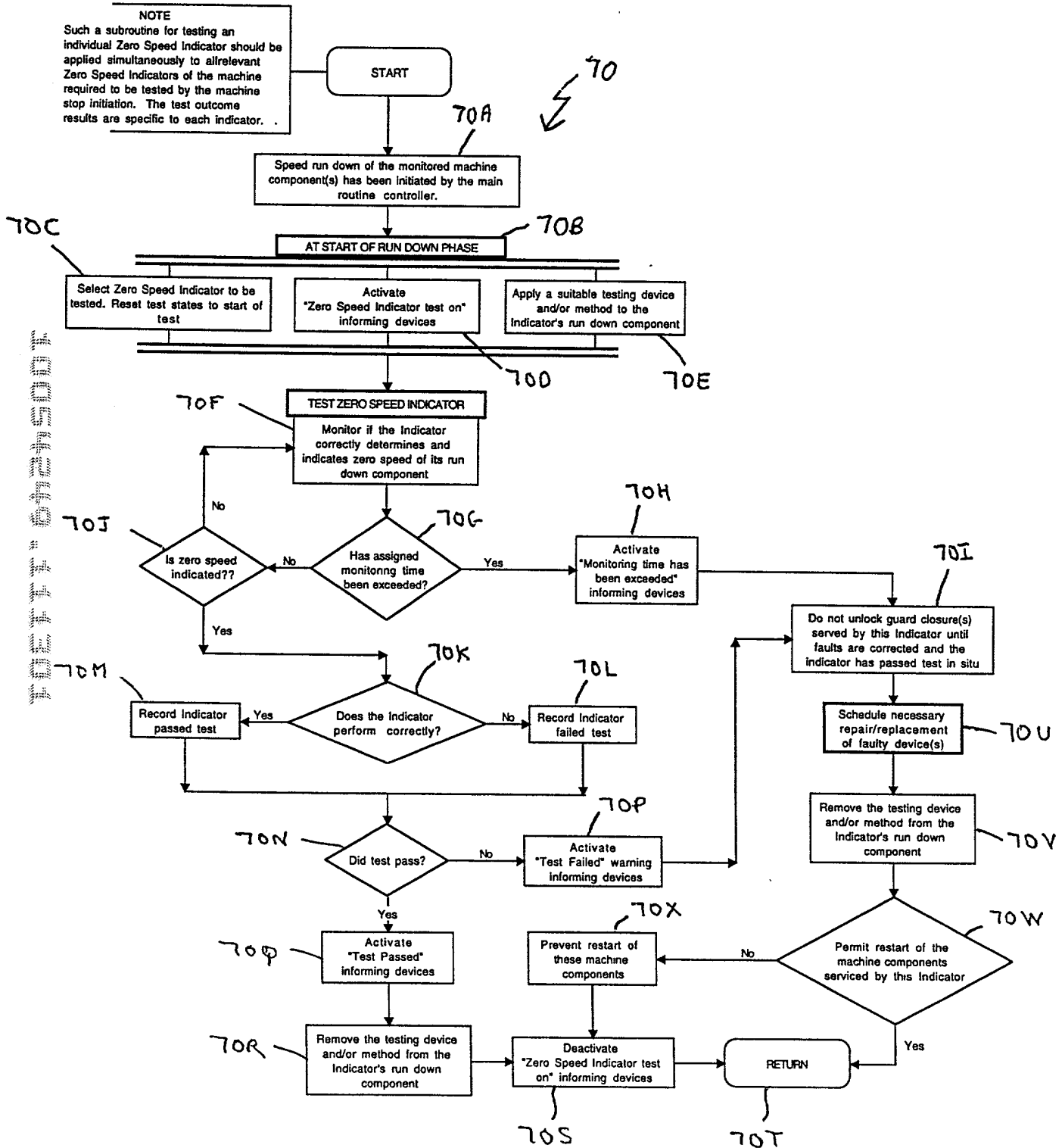


FIG. 6 ZERO SPEED INDICATOR TEST SUBROUTINE
IN SITU TESTING DURING THE SPEED RUN DOWN PHASES
CAUSED BY MACHINE STOP INITIATIONS



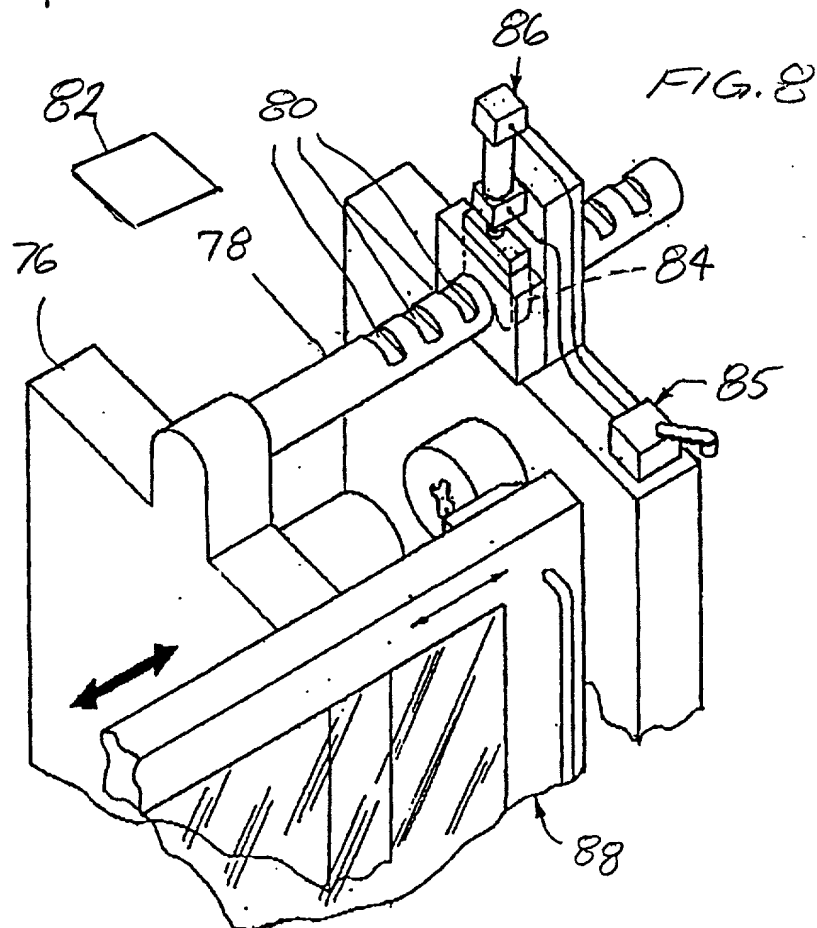
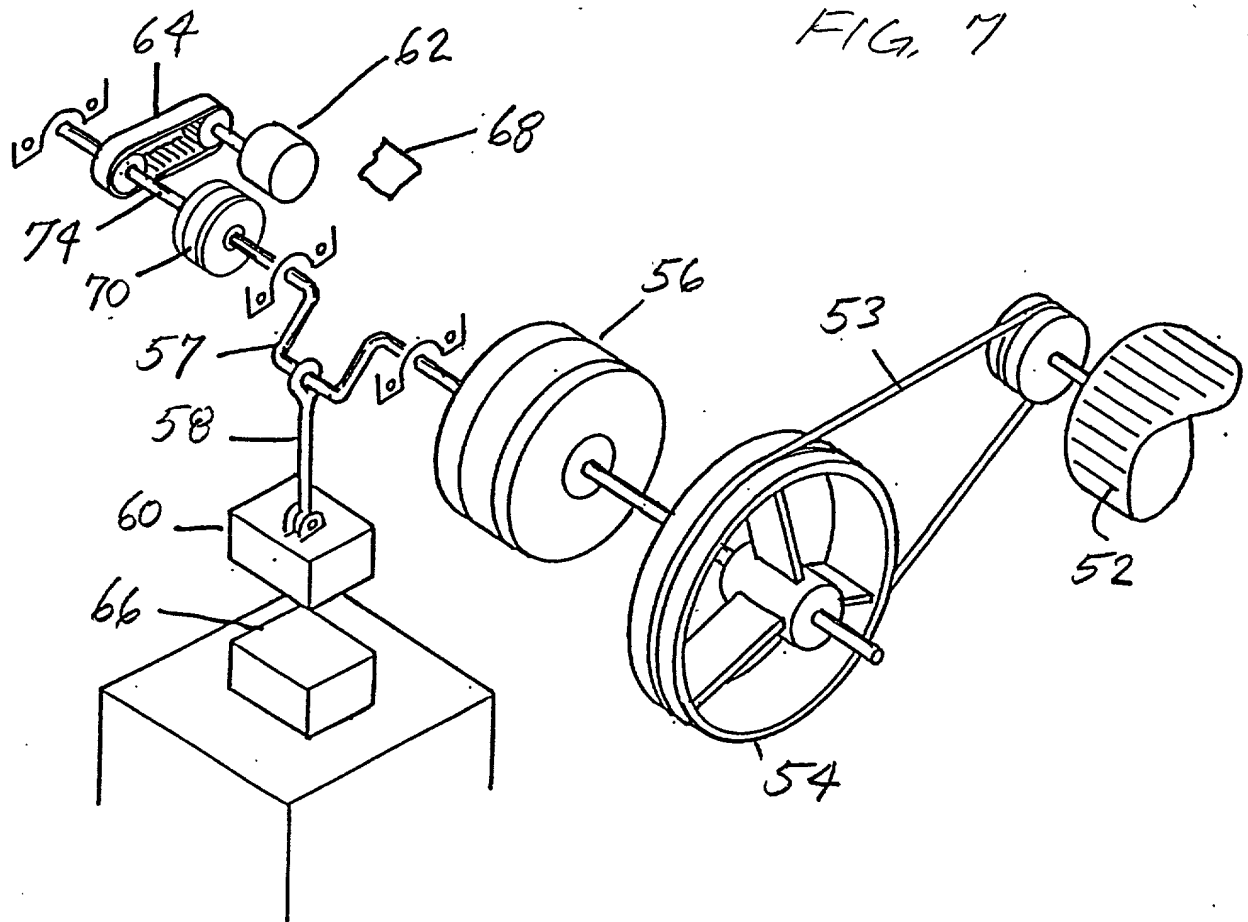


FIG. 9 SUBROUTINE FOR INSERTION OF A MOTION INTERFERENCE DEVICE AT SPEED RUN DOWN COMPLETION CAUSED BY MACHINE STOP INITIATIONS

NOTE

Such single location subroutines are to be applied individually but simultaneously to all relevant machine locations where the insertion of a motion blocking interference device is called for by the machine stop. The insertion outcome results are specific to each location.

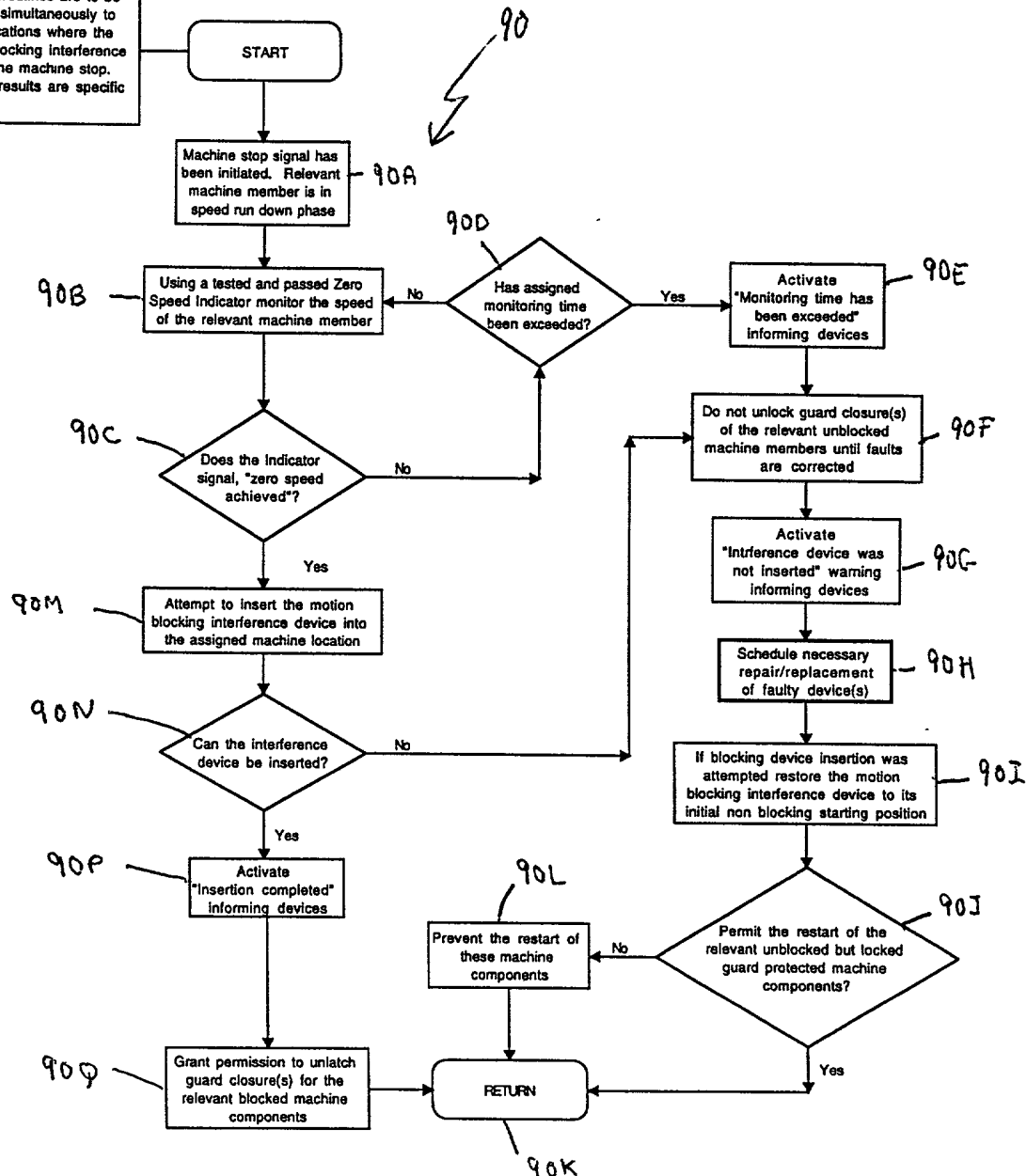


FIG. 12 SUBROUTINE FOR CHECKING THE FULFILLMENT OF NECESSARY CONDITIONS FOR UNLATCHING A GUARD CLOSURE

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NOTE

For the ultimate guard closure system, the Necessary Conditions for unlatching the guard closure must include the following results:

- Tests on guard closure locks have been passed.
- Test on guard closures by force/displacement device have been passed.
- Tests on interlocks have been passed.
- Tests on zero speed indicator have been passed.
- Zero speed system gives permission to unlatch the closure lock(s).
- Tests on timers or delay devices have been passed.
- Tests on interference systems have been passed.
- Interference devices are fully deployed.
- Tests of testers have been passed.
- Machine power has been interrupted by control stop signals, emergency stop devices, or by power disconnect.

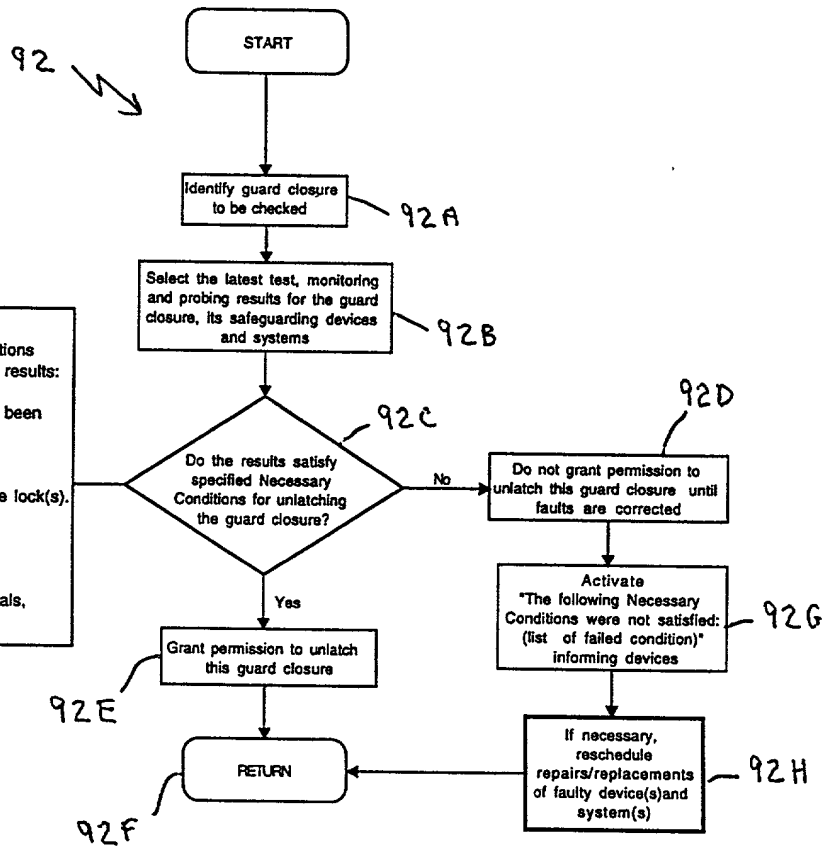
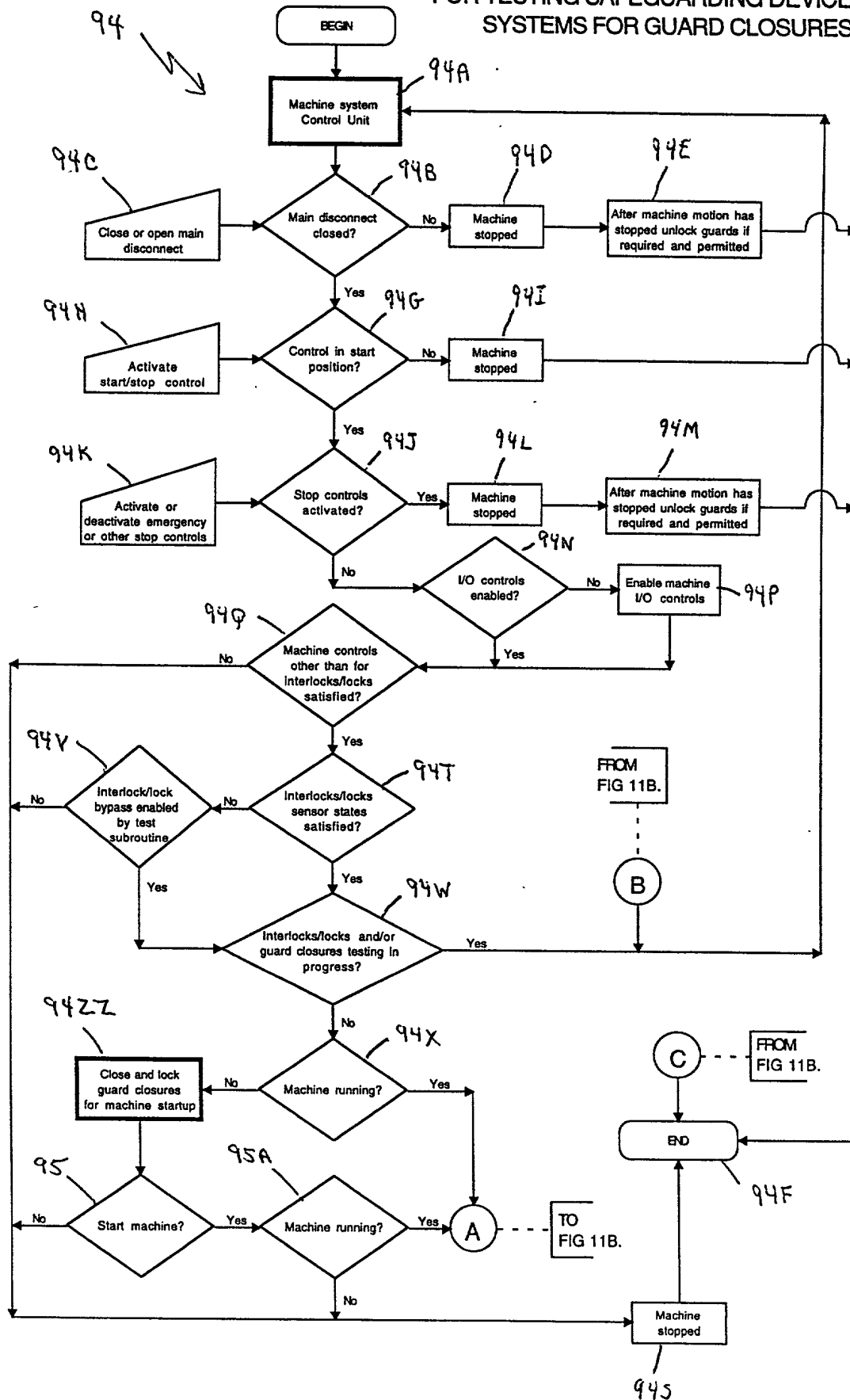


FIG. 11A EXAMPLE MAIN ROUTINE
FOR TESTING SAFEGUARDING DEVICES AND
SYSTEMS FOR GUARD CLOSURES



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